****Unpainted Steel Elements****

101 - Closed Web/Box Girder (LF)
106 - Open Girder (LF)
112 - Stringer (LF)
120 - Bottom Chord Through Truss (LF)
125 - Thru Truss Excluding Bottom Chord (LF)
130 - Deck Truss (LF)
140 - Arch (LF)
146 - Cable not embedded in concrete - Uncoated (EA)
151 - Floor Beam (LF)
160 - Pin and Hanger Assembly (EA)
201 - Column or Pile Extension (EA)
230 - Cap (LF)

	CDOT SUGGESTED CONDITION STATES FOR CORROSION ON UNPAINTED STEEL ELEMENTS	
	Description	CS
R1	Pitting or surface rust, etc. No measurable section loss	2
R2	Flaking, minor section loss (≤ 10% thickness loss)	3
R3	Flaking, swelling, mod. section loss (10% < thickness loss ≤ 30%) **structural analysis is not warranted.**	3
R3	Flaking, swelling, mod. section loss (10% < thickness loss ≤ 30%) **structural analysis is warranted due to location of corrosion on the member.**	4
R4	Heavy section loss (> 30% thickness loss), may have holes through base metal.	4

Condition State 1 **There is little or no corrosion** of the unpainted steel. The weathering steel is coating uniformly and remains in excellent condition.

Feasible Actions: 1) DN

Condition State 2 **Surface rust**, **surface pitting**, **has formed or is forming** on the unpainted steel. The weathering steel has not corroded beyond design limits, and the color is yellow orange to light brown.

Feasible Actions: 1) DN
2) Clean & Paint

Condition State 3 **Steel has measurable section loss due to corrosion but does not warrant structural analysis**. Weathering steel is dark brown to black.

Feasible Actions: 1) DN
2) Clean & Paint

Condition State 4 **Corrosion is advanced**. **Section loss is sufficient to warrant structural analysis** to ascertain the impact on the ultimate strength and/or serviceability of either the element or the bridge.

Feasible Actions: 1) DN
2) Rehab Unit
3) Replace Unit

****Painted Steel Elements****

102 - Closed Web/Box Girder (LF)
107 - Open Girder (LF)
113 - Stringer (LF)
121 - Bottom Chord Through Truss (LF)
126 - Thru Truss Excluding Bottom Chord (LF)
131 - Deck Truss (LF)
141 - Arch (LF)
147 - Cable not embedded in concrete - Coated (EA)
152 - Floor Beam (LF)
161 - Pin and Hanger Assembly (EA)
202 - Column or Pile Extension (EA)
231 - Cap (LF)

	CDOT SUGGESTED CONDITION STATES FOR CORROSION ON PAINTED STEEL ELEMENTS	
	Description	CS
Light R1	Slight peeling of the paint, pitting, or surface rust, etc. No measurable section loss	2
R1	Peeling of the paint, pitting, surface rust, etc. No measurable section loss	3
R2	Flaking, minor section loss (≤ 10% thickness loss)	4
R3	Flaking, swelling, mod. section loss (10% < thickness loss ≤ 30%) **structural analysis is not warranted.**	4
R3	Flaking, swelling, mod. section loss (10% < thickness loss ≤ 30%) **structural analysis is warranted due to location of corrosion on the member.**	5
R4	Heavy section loss (> 30% thickness loss), may have holes through base metal	5

Condition State 1 There is no evidence of active corrosion and the paint system is sound and functioning as intended to protect the metal surface.

Feasible Actions: 1) DN 2) Surface Clean

Condition State 2 **There is little or no active corrosion**. **Surface or freckled rust has formed or is forming**. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress but **there is no exposure of metal**.

Feasible Actions: 1) DN 2) Surface Clean
3) Surface Clean & Restore Top Coat

Condition State 3 **Surface or freckled rust is prevalent**. The paint system is no longer effective. **There may be exposed metal** but there is no active corrosion which is causing loss of section.

Feasible Actions: 1) DN 2) Spot Blast, Clean & Paint

Condition State 4 The **paint system has failed**. **Surface pitting may be present** but any section loss due to corrosion does not yet warrant structural analysis of either the element or the bridge.

Feasible Actions: 1) DN 2) Spot Blast, Clean & Paint
3) Replace Paint System

Condition State 5 **Corrosion has caused section loss and is sufficient to warrant structural analysis** to ascertain the impact on the ultimate strength of the element or the bridge.

Feasible Actions: 1) DN 2) Major Rehab Unit
3) Replace Unit

****P/S Concrete Elements****

104 - Closed Web/Box Girder (LF)
109 - Open Girder (LF)
115 - Stringer (LF)
143 - Arch (LF)
154 - Floor Beam (LF)
204 - Column or Pile Extension (EA)
226 - Submerged Pile (EA)
233 - Cap (LF)

CDOT SUGGESTED CONDITION STATES FOR CRACKS IN PRESTRESSED CONCRETE GIRDERS			
CS1	CS2	CS3	CS4
≤ 0.10 mm (≤ 0.004 in)	0.10 < W ≤ 0.25 (0.004 in)(0.009 in)	0.25 < W ≤ 0.76 (0.009 in) (0.030 in)	W > 0.76 mm (> 0.030 in)

CDOT SUGGESTED CONDITION STATES FOR PERCENT LOSS OF BEARING AREA			
LOSS OF BEARING AREA(%)			
PERCENT LOSS	≤ 10%	10 < % ≤ 20	> 20%
CONDITION STATES	2	3	4

Condition State 1 The element **shows no deterioration**. There **may be discoloration**, **efflorescence**, **and/or superficial cracking** but without effect on the strength and/or serviceability.

Feasible Actions: 1) DN

Condition State 2 **Minor cracks and spalls** may be present and there **may be exposed reinforcing with no evidence of corrosion**. There is no exposure of the prestressing system.

Feasible Actions: 1) DN
2) Seal Cracks, Minor Patching

Condition State 3 Some **delaminations and/or spalls may be present**. There may be **minor exposure but no deterioration of the prestress system**. **Corrosion of the non-prestressed reinforcement may be present** but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge.

Feasible Actions: 1) DN
2) Clean steel & Patch, (&/or Seal)

Condition State 4 Delaminations, **spalls and corrosion of the non-prestressed reinforcement are prevalent**. There may also be **exposure and deterioration of the prestress system** (manifested by **loss of bond**, **broken strands or wire**, **failed anchorages**, etc.). There is sufficient concern to **warrant an analysis** to ascertain the impact on the strength and/or serviceability of the element or the bridge.

Feasible Actions: 1) DN
2) Rehab Unit
3) Replace Unit

****Reinforced Concrete Elements****

105 - Closed Web/Box Girder (LF)
110 - Open Girder (LF)
116 - Stringer (LF)
144 - Arch (LF)
155 - Floor Beam (LF)
205 - Column or Pile Extension (EA)
210 - Pier Wall (LF)
215 - Abutment (LF)
220 - Submerged Pile Cap/Footing (EA)
221*- Pile Cap/Footing (EA)
227 - Submerged Pile (EA)
234 - Cap (LF)

SUGGESTED CONDITION STATES FOR CRACKS IN MILDLY REINFORCED CONCRETE GIRDERS						
WIDTH (W) in millimeters (inches)						
TYPE OF CRACK	NONE	≤ 0.8 mm (≤ 1/32 in)	0.8 < W ≤ 2 (1/32)(1/16)	2 < W ≤ 2.5 (1/16)(3/32)	2.5 < W ≤ 3 (3/32)(1/8)	W > 3 mm (> 1/8 in)
SHEAR	1	2				4
2	3	4				4
2	3	4	2	3	3	4

CDOT SUGGESTED CONDITION STATES FOR PERCENT LOSS OF BEARING AREA			
LOSS OF BEARING AREA(%)			
PERCENT LOSS	≤ 10%	10 < % ≤ 20	> 20%
2	3	4	

Condition State 1 The element shows no deterioration. There **may be discoloration, and/or superficial cracking** but without effect on the strength and/or serviceability.

Feasible Actions: 1) DN

Condition State 2 **Minor cracks and spalls may be present** but there is **no exposed reinforcing or surface evidence of rebar corrosion.**

Feasible Actions: 1) DN
2) Seal cracks, Minor Patching

Condition State 3 **Some delaminations and/or spalls may be present** and **some reinforcing may be exposed. Corrosion of the rebar may be present but loss of section is incidental** and does not significantly affect the strength and/or serviceability of either the element or the bridge.

Feasible Actions: 1) DN
2) Clean rebar and Patch (and/or seal)

Condition State 4 Advanced deterioration. **Corrosion of the reinforcement and/or loss of section is sufficient to warrant analysis** to ascertain the impact on the strength and/or serviceability of the element or the bridge.

Feasible Actions: 1) DN
2) Rehab Unit
3) Replace Unit

****Timber Elements****

111 - Open Girder (LF)
117 - Stringer (LF)
135 - Truss/Arch (LF)
156 - Floor Beam (LF)
235 - Cap (LF)

CDOT SUGGESTED CONDITION STATES FOR TIMBER GIRDERS, STRINGERS, CAPS AND FLOORBEAMS		
Splits < 3 ft long or checks > 1" deep = CS 2	Splits ≥ 3 ft long = CS 4	Any stress related full width crack (thickness of the section) = CS 4

CDOT SUGGESTED CONDITION STATES FOR PERCENT LOSS OF BEARING AREA			
LOSS OF BEARING AREA(%)			
PERCENT LOSS	≤ 10%	10 < % ≤ 20	> 20%
CONDITION STATES	2	3	4

CDOT Note: The worst condition state for the entire timber girder or stringer length is to be reported per girder or stringer (GCD01).

Condition State 1 Investigation indicates **no decay**. There may be **superficial cracks**, **splits**, **and checks** having no effect on the strength or serviceability.

Feasible Actions: 1) DN

Condition State 2 **Decay**, **insect infestation/marine borer infestation**, **abrasion**, **splitting**, **cracking**, **checking or crushing may exist** but none is sufficiently advanced to affect serviceability of the element.

Feasible Actions: 1) DN
2) Rehab &/or Protect Unit

Condition State 3 **Decay**, **insect infestation**, **abrasion**, **splitting**, **cracking or crushing** has produced **loss of strength of the element but not of sufficient magnitude** to affect the serviceability of the bridge.

Feasible Actions: 1) DN
2) Rehab Unit
3) Replace Unit

Condition State 4 Advanced deterioration. **Decay**, **insect infestation**, **abrasion**, **splits**, **cracks or crushing has produced loss of strength** that affects the serviceability of the bridge.

Feasible Actions: 1) DN
2) Rehab Unit
3) Replace Unit

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Appendix A
Miscellaneous

Minor corrections to newly printed inspection reports are to be made by **a red marker** on both the original inspection report and the unattached copy in the structure folder. The information in **the data base is to be corrected** as well.

Comments in the inspection reports are to be in **Type Case** (upper and lower case). Existing comments in UPPER CASE are to be re-typed. The use of ('YY PHOTOS) is acceptable, i.e. ('97 PHOTOS). **Avoid abbreviations in the Maintenance Activities** field.

All necessary **Maintenance Activities/Items** noted are to be included in the inspection report regardless of whether they will be done.

Special Inspections or partial inspections are required for particular structural components of selected bridges. NBI Item92C will have the appropriate code and NBI Item93C is updated with the date of inspection. **NBI Items 90A** (regular inspection date) **and 90B** (inspection team) **are not** to be **updated for partial inspections**.

NBI **Item122B** is to be coded **R for revisits** to bridges which are under construction or need to have inspection completed at another time. A date when the bridge may be inspected should be written on a note and placed in the structure folder. The **M must be removed** from Item122B **for new inspections**.

Pontis Program Quirks

Structure numbers must match exactly otherwise the program will think it is a new structure. Since both upper and lower case letters are used, no rules can be set. Lower case letters are only used for the third portion of the structure number on minor structures followed by the word "MINOR" in upper case. There are two spaces between a single lower case letter designation and the word "MINOR". For example, E-17-bp MINOR only has one space, however E-17-p MINOR has two spaces.

When adding elements to a bridge, **Item122C should have the inspection quarter coded** rather than leaving it blank. This will allow **the added element to be downloaded** when it is 'X-Picked'.

When duplicating or editing comments, the condition states need to be correct in the top most entry for that particular element. They do not need to be edited for each additional block of comments.

The **printed comment size** for an element **is limited to five full fields plus one additional line**. Additional comments may be recorded in Element 600 General Remarks field(s) for that element.

Appendix B
Abbreviations

Abut.	= Abutment	Gus.	= Gusset
Adj.	= Adjacent	H.L.	= Hairline
Agg.	= Aggregate	Horiz.	= Horizontal
Align.	= Alignment	Hvy.	= Heavy
Allig.	= Alligator	Int.	= Interior
&	= And	Jt.(s)	= Joint(s)
Asph.	= Asphalt	Lat.	= Lateral
@	= At	Lat. Br.	= Ltrl Bracing
Brg.(s)	= Bearing(s)	Len.	= Length
B.S.	= Both Sides	Lt.	= Left
Btwn	= Between	Longit.	= Longituduinal
Bot.	= Bottom	Low. = L	= Lower
C.L.	= Centerline	Med.	= Medium
Ctr.	= Center	Mid.	= Middle
[	= Channel	Mod.	= Moderate
Col.(s)	= Column(s)	N	= North
Conc.	= Concrete	Neop.	= Neoprene
Cond.	= Condition	#	= Number
Conn.	= Connection	Pl.	= Plate
Contam.	= Contamination	Rehab.	= Rehabilitate
Corr.	= Corrosion	Rt.	= Right
Cr.	= Crack	Shldr.	= Shoulder
Deg.	= Degree	S	= South
Delam.	= Delamination	SIP	= Stay-in-Place
Deter.	= Deterioration	S.F.	= Square Feet
Diag.	= Diagonal	Stalac.(s)	= Stalactite(s)
Diam.	= Diameter	Stl.	= Steel
Diaph.	= Diaphragm	Stgr.(s)	= Stringer(s)
Disint.	= Disintegrate	Stiff.(s)	= Stiffener(s)
D.S.	= Downstream	T. Welds	= Tack Welds
E	= East	Trans.	= Transverse
Efflor.	= Efflorescence	Typ.	= Typical
Elev.	= Elevation	U	= Upper
Expan.	= Expansion	U.S.	= Upstream
F.B.	= Floorbeam	Vert.	= Vertical
Fwd.	= Forward	Wtr. Stain	= Water stain
F.L.	= Full Length	W	= West
Flg.	= Flange	w/	= with
Ft.	= Feet	A1	= Abutment 1
Gir.(s)	= Girder(s)	P2	= Pier 2

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Appendix C
CDOT Bridge Maintenance Activities

All bridge maintenance activities are in the Structure Maintenance series (351 to 399).

The limits of the bridge maintenance activities are from the backface of abutment to backface of abutment and the adjacent approaches. These activities include but are not limited to the following:

Activity Number	Maintenance Activity
351.00	**Bridge/Structural Visual Inspection/Monitoring**
352.00	**Cleaning or Washing**
352.01	Clean out drains.
352.02	Remove sand and debris from bridge decks/sidewalks/curbs/ joints/abutments/piers/truss members.
353.00	**Bridge Deck Repair, etc.**
353.01	Seal open joints (non-expansion).
353.02	Tighten/repair timber decks.
353.03	Shore up bad concrete decks or patch holes through them.
353.04	Patch delaminations, spalls, or potholes in deck surfaces (concrete or asphalt), seal concrete deck surfaces, install waterproofing membrane.
353.05	Repair/replace metal decking.
353.06	Repair/extend/redirect deck drains.
353.07	Repair joints (non-expansion) e.g. "D" cracking.
353.08	Pavement crack sealing.
353.09	Overlay candidate, contact Staff Bridge.
354.00	**Superstructure**
354.01	Repair damaged girders/truss members (collision).
354.02	Repair girders/truss members(non-collision).
354.03	Not used.
354.04	Remove formwork/debris from inside box girders.
354.05	Repair or maintenance work in tunnels or at tunnel portals.
355.00	**Clean and Paint bridge**
355.01	Clean and paint bridge (include bearings).
355.02	Clean and spot paint bridge (include bearings).
355.03	Clean and paint bridge rail.

356.00 Curbs and Rail

356.01 Replace damaged bridge rail.

356.02 Repair/Replace curb/sidewalk or wheel guard.

357.00 Bearings

357.01 Remove sand/debris from around bearings.

357.02 Clean, lubricate if necessary, and paint bearings if necessary.

357.03 Replace bearings/bearing area (pulpits or saddles).

357.04 Replace concrete bearing area.

357.05 Reset bearings.

358.00 Substructure

358.01 Repair/replace backing planks/piles/caps in abutments or piers (timber only).

358.02 Repair, shore up, or replace damaged substructure where it could cause the bridge to fail (imminent only).

358.03 Fill scour holes around piers, abutments, and at ends of CBC's.

358.04 Remove water/wind borne debris from structure or channel.

358.05 Repair/replace damaged/deteriorated concrete/steel or exposed piles in abutments/piers/headwalls.

358.06 Repair/replace wingwalls, with piles, backing planks, deadman etc.

360.00 Approach Slabs and Slope Protection

360.01 Repair low approaches.

360.02 Fill voids or holes at the backface of the abutments and the approaches.

360.03 Replace/repair berms/fill slopes and slope protection.

364.00 Expansion Joints

364.01 Repair/replace expansion joints and seals.

364.02 Tighten expansion joint.

398.00 Miscellaneous Bridge Work

Describe the type of miscellaneous work needed that is not covered under another activity e.g. wrong structure number, loose utilities, etc.

399.00 Maintenance Requiring Engineering

Describe the condition that requires engineering before maintenance can proceed with the repair.